VIRGINIA'S TRIBUTARY STRATEGIES

A customized approach to reduce nutrient pollution in the rivers flowing into the Chesapeake Bay

Revising Virginia's Chesapeake Bay Tributary Strategies

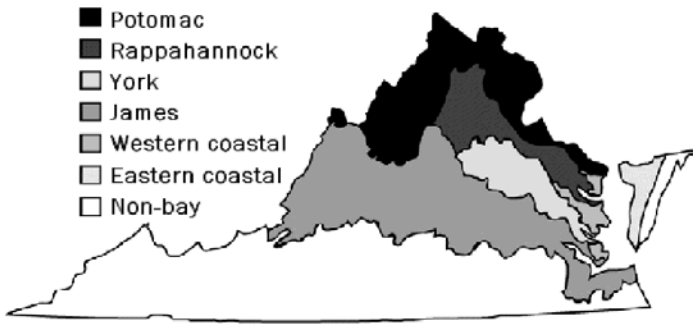
The Eastern Shore

Introduction

Since the early 1990s, Virginia has worked to develop and implement water quality plans, tributary nutrient reduction strategies, for each main tributary waterway of the Chesapeake Bay. These strategies have their beginnings in the Chesapeake Bay Program and the scientific research that identified excess nutrients, primarily nitrogen and phosphorus, and sediment as the greatest water quality problems faced by Chesapeake Bay and its tributaries.

Virginia's tributary strategies are based on a cooperative, voluntary approach to restoring water quality. In developing these strategies, Virginia's natural resources agencies work closely with local governments, farmers, conservation groups, wastewater treatment plant operators and others who have an important stake in ensuring clean water in their community. This locally based approach helped the commonwealth and its citizens craft tributary strategies with effective solutions rooted in practical methods.

Virginia's Bay Watersheds



Eastern Shore Watershed Fast Facts

- *Drainage Area in Acres: 1,651,570*
- *Square Miles: 2,580*
- *About 6 percent of Virginia's land base*
- *Length of peninsula: 80 miles*
- *Counties: 2*
- *Towns: 15*
- *Bay Portion 2000 Population: 27,527*
- *Larger Tributaries: Onancock Creek, Pungateague Creek, Occohannock Creek, Nassawaddox Creek, Old Plantation Creek, Kings Creek, Hungars Creek, Cherrystone Creek, Pitts Creek, Holdens Creek*

Today Virginia and her bay state partners face a new and daunting chapter in restoring water quality that will sustain living resources and aquatic habitats in the bay and its tidal tributaries. Changing water quality conditions have led Chesapeake Bay partners to develop new nutrient and sediment reduction goals. An ambitious timetable adopted in the new Chesapeake Bay Agreement, *Chesapeake 2000*, calls for removing the bay and its tidal tributaries from the federal list of impaired waters by 2010. With the new goals in hand, Virginia is now embarking on a process with local stakeholders to revise existing tributary strategies. Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and how best to do it.

Focus on Nutrients and Sediment

Nutrient enrichment is a surplus of phosphorus and nitrogen that runs off land, settles from the air, or is discharged from industrial or municipal sources. It's one of the bay system's key pollution problems.

Another is sediment that comes mainly from erosion. It can smother aquatic plants and animals.

The rivers and the bay support various valuable living resources such as oysters, fish, crabs, waterfowl

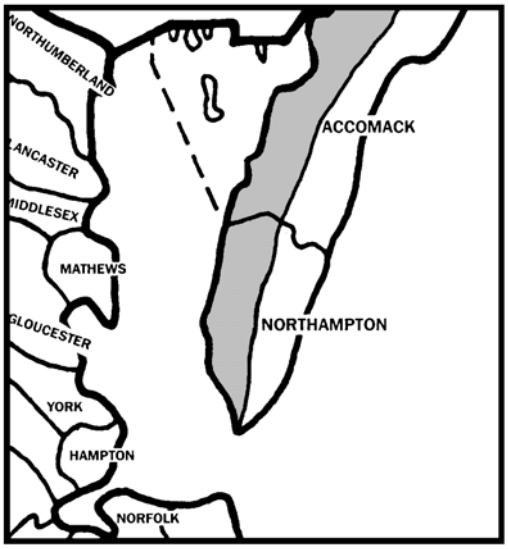
and many kinds of underwater plants. This aquatic life needs dissolved oxygen to survive. But excess nitrogen and phosphorus over-fertilize bay waters causing an abundance of algae that prevent sunlight from reaching underwater plants. When the algae die, the decay process robs the water of oxygen.

Nutrients occur naturally and would flow into bay waters even if people were not living around its shores. But excess amounts of nutrients come from sewage treatment plants, some industries, agricultural and lawn fertilizers, and a variety of other sources.

There are two main pathways nitrogen and phosphorus take to enter the bay and its rivers. One is *point source pollution*, which occurs primarily when sewage treatment plants and industrial facilities discharge treated wastewater into a river or stream. The other is *nonpoint source pollution*, most of which is runoff from farm and pasture land, and from development in urban and suburban areas.

For point sources, Biological Nutrient Removal (BNR) technology is one key to success. BNR can eliminate between 60 and 85 percent of the nutrients that treatment plants discharge.

For nonpoint source pollution, best management practices (BMPs) are the key to reducing nutrient levels. Farmers, in particular, can and do reduce nonpoint source pollution by conscientiously managing agricultural land. The core of the nonpoint portion of any tributary strategy is the continuation of current programs and activities, such as farm plan implementation, conservation tillage, nutrient management, and management of animal wastes and highly erodible lands, plus greater focus on lawn care by homeowners. Stormwater management also is key to eventual success in nutrient and sediment reductions.



The Eastern Shore Watershed

Virginia's Eastern Shore is an 80-mile long peninsula of approximately 696 square miles. It lies at the southern end of the Delmarva Peninsula and is bound by the Chesapeake Bay on the west, the Atlantic Ocean on the east and Maryland to the north. About half the Eastern Shore drains to the Chesapeake Bay.

Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and the best ways to do it.

The Eastern Shore is long and narrow with numerous small watersheds that comprise a complex system of tidal creeks, guts and inlets. Shore tributaries draining into the bay include the Onancock, Pungateague, Occohannock and Nassawadox creeks, and numerous smaller waterways such as the Old Plantation, Kings, Hungars, Cherrystone, Pitts and Holdens creeks. Tidal portions of these creeks are generally deeper and wider at their mouths and very shallow inland. Freshwater portions of these creeks can be very shallow and narrow, and the watersheds of the coastal creeks are small, particularly when compared with watersheds of the lower bay rivers. The creeks and streams that flow into the bay are influenced by tides thus have a more direct connection to bay waters.

Forest and agriculture dominate the Eastern Shore's land use on the bay side, and there are scattered industrial areas and more dense development around towns. Forest accounts for about 51 percent of the region's land, agriculture about 38 percent, and urban areas about 6 percent.

Major Pollutants

Water quality in the Chesapeake Bay and its tributaries has been degraded by nutrient over-enrichment. Excess nutrients - nitrogen and phosphorus - stimulate unwanted growth of algae.

In 2000, nitrogen came primarily from farmland, accounting for 68 percent of the total controllable nitrogen load in the Eastern Shore's Chesapeake Bay coastal watershed. Point sources were the second largest contributor, yielding 13 percent of the total controllable nitrogen load. Forest land contributed 5.5 percent, and urban land use and septic systems contributed 4 and 3.7 percent respectively.

Phosphorus loadings also were primarily attributed to agricultural land uses. Sixty-two percent of the total controllable phosphorus originated from farmland. Point

sources were the second largest contributor, with 23 percent of the total controllable phosphorus load. Mixed open and urban land uses contributed 8 and 6 percent respectively.

Another important element affecting water quality in the near shore area is sediment suspended in the water column. High sediment concentrations block sunlight needed by underwater grasses. This results in worsened feeding patterns of plankton and juvenile fish. When settled, sediment can suffocate shellfish and benthic organisms and cover hard substrate needed for attachment and growth. Within the basin, agricultural land uses contributed 84 percent of the controllable sediment load. Forest land use accounted for about 10 percent, with urban and mixed open land uses contributing about 3 percent each.

Methods of Controlling Pollution

There are many effective ways to curtail pollution in the watershed. Education on proper lawn care and maintenance of septic systems, municipal wastewater treatment upgrades, greater installation of agricultural and forestry BMPs, better stormwater management, and erosion and sediment control are but a few. Individual citizens can become involved in hands-on programs such as the Department of Conservation and Recreation's Adopt-A-Stream and water monitoring activities that encourage environmental awareness and stewardship.

Watershed Management Planning

Virginia's Eastern Shore Watersheds Network is creating and implementing watershed plans. The group has applied for a grant to create a watershed management plan for the Cherrystone Inlet watershed.

Previous Tributary Strategy Work

The primary objective of the initial *Eastern Shore Tributary Strategy* process and final plan was to identify practical, cost-effective and equitable ways to reduce nutrient and sediment loads. This was accomplished by providing the best available information on land use, nutrient and sediment loads, water quality conditions and management practices to local decision-makers. The strategy was intended to serve as an implementation guide for providing funding for identified nutrient and sediment controls. Because water quality monitoring and modeling data were not available, greater efforts were made to achieve this objective. Other objectives addressed informing citizens of factors affecting water quality of creeks and streams, and identifying ways they can restore these waterways.

The Eastern Shore Tributary Strategy process began in April 1998 with a meeting that drew state and local government officials and staff, and representatives from the Eastern Shore Soil and Water Conservation District, Natural Resources Conservation Service, Virginia Cooperative Extension, members of Citizens for a Better Eastern Shore and other concerned, private citizens. The Chesapeake Bay Local Assistance Department (CBLAD) provided the tributary strategy's team leader who coordinated the process. The strategy, which focused on the installation of agricultural BMPs, was finished in November 1999. Those involved also felt there should be increased water quality monitoring and computer modeling for the creeks.

The 1999 Eastern Shore tributary strategy includes 2003 nonpoint source nutrient and reduction targets calling for the following annual loads based on 1985 nonpoint source controllable loadings: nitrogen 1,323,500 pounds; phosphorus 77,130 pounds; and sediment 20,260 tons.

Stakeholders felt a strong need to focus on educating citizens and others on the importance of water quality on the Eastern Shore. The Eastern Shore Watersheds Network was formed to build a partnership of citizen, agencies, organizations and business to promote stewardship activities that conserve, restore, enhance and protect the Eastern Shore's watershed resources. The organization is accomplishing this by supporting community initiatives in planning, research and educational, citizen outreach. The group has written a plan for water quality monitoring and established the Citizen Epiphyte Monitoring Program and the annual Eastern Shore Watersheds Festival.

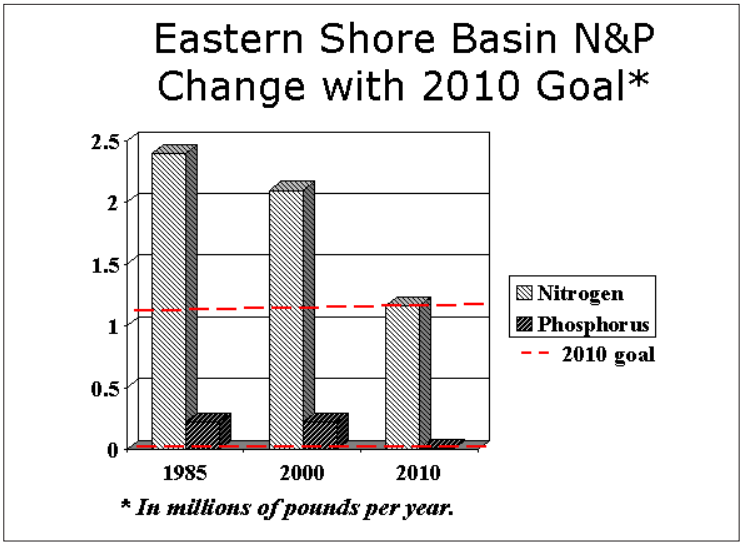
New Load Allocations for the Eastern Shore Watershed

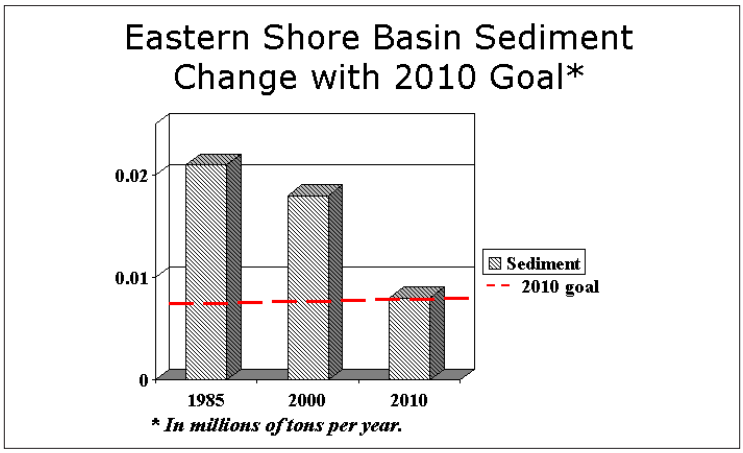
In 2003, new nutrient and sediment load allocations were determined by the multi-jurisdictional Chesapeake Bay Program for all sub-watersheds of the larger Chesapeake Bay watershed. Changes for the Eastern Shore include a 45 percent reduction in nitrogen, a 64 percent reduction in phosphorus and a 56 percent reduction in sediment loads from levels observed in 2000.

The table and charts on the following page show the change in total nitrogen, phosphorus and sediment in the Eastern Shore watershed between the original baseline year, 1985, and the newly established baseline year of 2000. Accomplishments within that 15-year period are displayed in the table as a percent change for each pollutant. The cap loads, which were set by the Chesapeake Bay Program, have been determined for each pollutant and are also listed on the following page. The newly revised tributary strategy will devise a plan on how to meet and maintain the updated, reduced loads.

Eastern Shore Watershed: C2K total nitrogen, phosphorus and sediment cap load allocations (includes point and nonpoint source pollution)

Year	Tot. N (million lbs/yr)	Tot. P (million lbs/yr)	Sediment (million tons/yr)
1985	2.4	.22	.021
2000	2.1	.22	.018
CAP	1.16	.08	.008
% CHG 85-00	-13%	0%	-14%
% CHG 00-CAP	-45%	-64%	-56%





What Lies Ahead

Between now and April 2004, the state will redouble its efforts to revise the Eastern Shore Tributary Strategy. The state will work with diverse stakeholders representing local governments, agricultural and development communities, soil and water conservation districts, wastewater treatment operators, planning district commissions, conservation groups and others to develop a strategy unique to the Eastern Shore watershed. The strategy is meant to meet the assigned nutrient and sediment reduction goals.

This new strategy will provide a menu of reduction actions that focus on varied pollution sources and land uses. As in past strategies, agricultural practices and wastewater treatment plant improvements will be important. It is also anticipated that the strategy will focus more on urban and suburban stormwater management, changing land use, low impact development and public education than did previous work.

The strategy will examine reductions that can be achieved locally with existing resources. It will explore what might be achieved locally with additional resources and what could be accomplished through broader statewide initiatives.

The strategy will outline a phased approach to implementation and to capping nutrient and sediment loads once the reduction goals are reached. It will also look at the future need to track nutrient and sediment loads and allocations as this reduction strategy becomes a cap strategy.

Become involved in this important process. For more information on the development of the new Eastern Shore Tributary Strategy or on other water quality initiatives in the watershed, contact Ernie Brown, (757) 925-2468, *ebrown@dcr.state.va.us*.

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